

## **Sixth International Conference on Systems Biology (ICSB 2005)**

The DOE grant DE-FG02-05ER64099 supported the Sixth International Conference on Systems Biology (ICSB 2005), held in Boston, Massachusetts from October 19th to 22nd, 2005. This conference was coordinated by Prof Andrew Murray from Harvard University with help from Systems Biology institutes at other Boston area universities.

### **Program and Speakers**

#### **Wednesday October 19, 2005**

8:00 AM - 9:00 PM Registration

9:00 AM - 5:00 PM Tutorials

6:00 PM - 7:00 PM Welcome and keynote lecture  
Using fluorescence to study the E. coli chemotaxis  
signaling pathway

Howard Berg (Harvard University)

7:00 PM - 8:30 PM Opening Reception

#### **Thursday October 20, 2005**

8:00 AM - 5:00 PM Registration

9:00 AM Opening Remarks

Peter Sorger (Massachusetts Institute of Technology)

#### *Session I: Biology by Design*

*J. J. Collins* (Boston University): Integrating  
synthetic biology and systems biology

*Christopher Voigt* (University of California, San  
Francisco): Programming bacteria: wiring synthetic  
sensors and circuits to heterologous outputs

*Jeffrey Tabor* (University of Texas at Austin): Tuning  
noise in global gene expression

*Jay Keasling* (University of California, Berkeley):  
Engineering bacteria for production of an anti-malarial  
drug

Lunch

1:30 PM

*Session II: Evolution in Action*

*Jack Szostak* (Howard Hughes Medical Institute and Massachusetts General Hospital): Laboratory models of protocell structure and behavior

*Dominique Schneider* (Université Joseph Fourier): Genotype to fitness phenotype mapping and the evolution of regulatory networks during experimental evolution in *Escherichia coli*

*Hod Lipson* (Cornell University): Evolving engineering systems

*Vitor Martins dos Santos* (German Research Centre for Biotechnology): Understanding metabolic networking in microbial consortia by flux balancing, kinetic modeling and experimental validation

*Joan Strassmann* (Rice University): Social amoebae as model systems for genetics and evolution of social interactions

5:00 PM Keynote Lecture

*Steven Strogatz* (Cornell University): Synchronization, singularities and circadian clocks: lessons from Art Winfree's pre-molecular approach to systems biology

6:00 - 8:00 PM Poster session and reception

**Friday October 21, 2005**

9:00 AM

*Session III: Intracellular Networks*

*Tobias Meyer* (Stanford University): Dissecting signaling networks using cell perturbations and fluorescence imaging

*Peter Sorger* (Massachusetts Institute of Technology): Systems biology of cytokine networks

*Daphne Koller* (Stanford University): Modeling conservation and variation in regulatory networks

*Jörg Stelling* (ETH Zürich): Precise intracellular spatial sensing through GTPase cascades

*Rama Ranganathan* (Howard Hughes Medical Institute and University of Texas Southwestern Medical Center): Evolutionary information specifying protein folding and function

Lunch

2:00 PM

*Session IV: Intracellular Dynamics and Multicellular Networks*

*Michael Elowitz* (California Institute of Technology): Gene circuits and differentiation at the single-cell level: slow, noisy, and out of control

*Eric Wieschaus* (Howard Hughes Medical Institute and Princeton University): Maternal gradients and size regulation in insect embryos

*Naama Barkai* (Weizmann Institute of Science): Modeling threshold response to a morphogen gradient

*Hiroki Ueda* (RIKEN): System-level identification of mammalian circadian clocks

*Claire Tomlin* (Stanford University): Using mathematical modeling to help decode biological circuits

5:30 - 7:30 PM      Poster session and reception

7:30 PM      Student Symposium

**Saturday, October 22, 2005**

9:00 AM

*Session V: Mechanics and Scale in Cellular Behavior*

*Julie Theriot* (Stanford University): Pushing ahead: force generation and large-scale self-organization by growing actin filament networks

*François Nédélec* (European Molecular Biology Laboratory, Heidelberg): Simulating the interphase microtubule organization in fission yeast

*Geoffrey West* (Santa Fe Institute and Los Alamos National Laboratory): Universal scaling laws in biology from genomes to ecosystems: towards a quantitative

unifying theory of biological structure and organization

*Yannis Kalaidzidis* (Max Planck Institute of Molecular Cell Biology and Genetics, Dresden): Rab-5 endosome movement as a regulated random walk

*Mike Tyers* (Samuel Lunenfeld Research Institute and University of Toronto): Cell size control networks

Lunch  
2:00 PM

*Session VI: Multicellular Networks and Intracellular Dynamics*

*David Harel* (Weizmann Institute of Science): Comprehensive and realistic modeling of biological systems: what, how and why

*Erin O'Shea* (Howard Hughes Medical Institute and Harvard University): Cellular nutrient homeostasis

*Mukund Thattai* (National Centre for Biological Sciences, Bangalore): Dynamical properties of the yeast cell cycle network

*Chao Tang* (University of California, San Francisco): Anticipation and response in cell signaling

5:10 PM Keynote Lecture  
*Bonnie Bassler* (Howard Hughes Medical Institute and Princeton University): Getting the message through: reliable communication among bacteria

6:10 PM Closing Remarks  
Marc Kirschner (Harvard University)

**Sunday October 23, 2005 and Monday October 24, 2005**

9:00 AM - 5:00 PM  
Workshops